IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	10/658,703	Confirmation No. 2306
Applicant	:	Santi Kulprathipanja et al.	
Date Filed	:	September 9, 2003	
Art Unit	:	1797	
Examiner	:	Prem C. Singh	
Docket No.	:	108297	
Customer No.	:	23490	

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

April 9, 2008

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION — 37 C.F.R. § 41.37)

1. Transmitted herewith, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on February 19, 2008.

2. STATUS OF APPLICANT — This application is on behalf of other than a small entity.

3. FEE FOR FILING APPEAL BRIEF — Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is $510.

4. EXTENSION OF TERM — Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE — $510

6. FEE PAYMENT — Authorization is hereby made to charge the amount of $510 to Deposit Account Number 01-1125.

7. FEE DEFICIENCY — If any additional extension and/or fee is required and/or if any additional fee for claims is required, charge to Deposit Account Number 01-1125.

Respectfully submitted,

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APPEAL BRIEF

Before

Board of Patent Appeals and Interferences

in the

United States Patent & Trademark Office

In re:

U.S. Application No.	:	10/658,703
Inventor(s)	:	Santi Kulprathipanja et al.
Date Filed	:	September 9, 2003
Assignee	:	UOP LLC
Examiner	:	Prem C. Singh
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Table of Contents:

I. Real Party in Interest

UOP LLC is the real party in interest.

II. Related Appeals and Interferences

There are no pending appeals or interferences known to the Applicants.

III. Status of Claims

Total number of claims in this application are 23. Claims 2-6, 8, 10, 11, 14 and 18-20 are as originally filed. Claims 1, 7, 9, 12, 13, 15, 16 were amended, and claims 21-23 were added as new in Response (B) dated April 17, 2007, in response to the Advisory Action dated March 6, 2007. Claims 1, 16, 17 and 21 were amended in Response (C) dated September 12, 2007. Examiner rejected claims 1-23 in Final Office Action dated October 19, 2007. Claims 1-23 are reproduced in Appendix A.

IV. Status of Amendments

No amendments have been filed subsequent to the Final Office Action dated October 19, 2007.

V. Summary of Claimed Subject Matter

The invention is a product by process, where the product is a modified alkylbenzene (MAB). The MAB is produced by a process wherein a lightly branched acyclic paraffin, having from 8 to 28 carbons, is selectively adsorbed on a silicalite adsorbent to separate the lightly branched acyclic paraffin from more highly branched paraffins. The lightly branched acyclic paraffin is desorbed from the silicalite adsorbent using a C5-C8 cyclo paraffin, normal paraffin, or branched paraffin, and passed to a dehydrogenation zone where the lightly branched acyclic paraffin is dehydrogenated to from a lightly branched monoolefin. The lightly branched monoolefin is passed with a phenyl compound to an alkylation zone comprising a solid molecular sieve alkylation catalyst. The molecular sieve alkylation catalyst is a physically constraining catalyst that limits the isomerization of the lightly branched alkyl group to produce a high quality modified alkylbenzene.

VI. Grounds of Rejection

Claims 1-23 were rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Jones (US Patent 3,303,233), both in the Office Actions dated October 19, 2007, and June 22, 2007. Jones teaches the production of linear alkylbenzenes (LABs), where the process separates normal paraffins from a paraffin mixture by passing the paraffin mixture over a molecular sieve to produce a 99+ percent normal paraffin purity. The normal paraffin is desorbed using n-pentane to desorb the normal paraffin. The normal paraffin is then halogenated, preferably with bromine, to produce a monohalogenated paraffin. The monohalogenated paraffin is then processes through a dehydrohalogenation process to form a linear monoolefin. The linear monoolefin is passed with benzene to an alkylation reactor using a mineral acid catalyst such as sulfuric acid, or hydrofluoric acid. The grounds for rejection are that Jones provides an alkylating agent which when combined with an alkylatable aromatic compound produces an alkylate having a structure suitable for the production of biologically soft detergents. The alkylbenzenes disclosed in Jones invention is produced by using normal paraffins separated on a molecular sieve, dehydrogenating and reacting with benzene under typical operating conditions.

VII. Arguments

The examiner has likened all alkylbenzene production processes and alkylbenzene products into one category of biologically soft detergents. To begin with, the Applicants' attorney incorrectly stated "[t]his solid catalyst is a physically constraining catalyst which limits undesired reactions and produces a much higher LAB content in the product". The Applicants' attorney meant to state that "[t]his is a physically constraining catalyst which limits undesired reactions and produces an MAB product." The product is much different from Jones. Jones emphasizes the linearity and strives for a high degree of linearity of the alkyl group. The present invention has found that lightly branched alkyl groups are equally biodegradable and can be more economically produced.

The present invention does not meet the anticipation test as the present invention uses silicalite which allows for the recovery of lightly branched paraffins, whereas Jones uses a specific molecular sieve having a small pore size to recover 99+ percent normal paraffins, and Jones does not suggest that lightly branched paraffins are as useful. Jones uses an n-pentane desorbent to recover the normal paraffin, but the present invention allows for the use of C5-C8 cyclo paraffins and C5-C8 branched paraffins for desorbing the lightly branched paraffin. Jones uses a halogenation process followed by a dehydrohalogenation process. The present invention uses a catalytic dehydrogenation process which forgoes the halogenation step and the dehydrohalogenation step. Jones uses a liquid acid catalyst for the alkylation step, whereas the present invention uses a solid acid catalyst that is designed to limit isomerization of the alkyl group during the alkylation step. And Jones emphasizes the need to maintain olefin linearity in the

dehydrogenation process to obviate, or at least minimize, isomerization of the olefin to any branched analogs. This is teaching away from the use of lightly branched olefins for the production of MABs. It is submitted that the present invention is not anticipated by Jones because elements of the present invention are not present nor hinted at in the reference, such as the use of silicalite to separate a lightly branched paraffin from a hydrocarbon mixture, the use of non-normal desorbents for recovering the lightly branched paraffins from the silicalite, the use of a catalytic dehydrogenation process without resorting to halogenation, and the use of a solid acid catalyst for the alkylation step.

The present invention does not meet the obviousness test because the present invention uses lightly branched paraffins, when Jones teaches the use of high purity normal paraffins, and Jones stresses the need for high percent of normal paraffins. The present invention allows the use of non-normal C5-C8 paraffins for desorption, whereas Jones teaches the use if isopentane to purge the adsorbent before using n-pentane to desorb the normal paraffins. Jones is teaching the removal of non-normal paraffins, including lightly branched paraffins, before proceeding with the dehydrogenation step. In the dehydrogenation step, Jones teaches the use of halogenation, followed by a dehydrohalogenation step. Jones states "catalytic dehydrogenation of paraffinic hydrocarbons involves a highly endothermic type of reaction which is conducive to isomerization of the paraffinic hydrocarbons and their olefin dehydrogenation products. The inclusion of a hydrogen acceptor such as chlorine, bromine, iodine and fluorine, in the dehydrogenation reaction mixture alters the course of the reaction . . . thereby obviating, or at least minimizing, isomerization of the paraffinic feed stock and the resulting olefins to their branched analogs." This teaches away from the use of branched paraffins or olefins, and teaches away from using a catalytic dehydrogenation process, which the present invention uses. Jones further teaches the use of a liquid acid catalyst for a homogeneous acid catalyzed alkylation process. The present invention uses a solid acid catalyst that is restricts the ability of isomerization of the alkyl group during the alkylation process. This is not taught or suggested by Jones. Therefore, it is submitted that the present invention is not obvious as Jones does not disclose many of the steps in the present invention, and even teaches away from the present invention.

VIII. Appendix: Claims on Appeal

1. A modified alkylbenzene composition produced by a process, the process comprising the steps of:

a) passing a feed stream comprising a lightly branched C_8-C_{28} acyclic paraffin and at least one other acyclic paraffin and having a first concentration of the lightly branched acyclic paraffin to an adsorption zone comprising a bed of an absorbent comprising silicalite at adsorption promoting conditions to selectively adsorb the lightly branched acyclic paraffin, contacting the bed of adsorbent with a desorbent stream comprising at least one component selected from the group consisting of a C_5-C_8 cycloparaffin, a C_5-C_8 normal paraffin, and a C_5-C_8 branched paraffin and recovering from the adsorption zone an adsorption extract having a second concentration of the lightly branched acyclic paraffin that is greater than the first concentration;

b) passing at least a portion of the adsorption extract to a dehydrogenation zone, operating the dehydrogenation zone at dehydrogenation conditions sufficient to dehydrogenate the acyclic paraffin, and recovering from the dehydrogenation zone a dehydrogenated product stream comprising a lightly branched C_8 - C_{28} acyclic monoolefin;

c) passing a feedstock comprising a phenyl compound and passing at least a portion of the dehydrogenated product stream comprising the acyclic lightly branched monoolefin to an alkylation zone, operating the alkylation zone at alkylation conditions sufficient to alkylate the phenyl compound with the lightly branched acyclic monoolefin in the presence of a solid, molecular sieve alkylation catalyst to form phenyl-alkanes comprising molecules having one phenyl portion and one C_8-C_{28} aliphatic alkyl portion; wherein the aliphatic alkyl portion no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the phenyl portion; and wherein the phenyl-alkanes have selectively to 2-phenyl-alkanes of from about 40 to about 100 and a selectivity to internal quaternary phenyl-alkanes of less than 10; and

d) recovering the phenyl-alkanes from the alkylation zone.

2. The composition of Claim 1 wherein the phenyl-alkanes have a selectivity to 2-phenyl-alkanes of from about 50 to about 100.

3. The composition of Claim 1 wherein the phenyl-alkanes have a selectivity to 2-phenyl-alkanes of about 60 to about 100.

4. The composition of Claim 1 wherein the phenyl-alkanes have a selectivity to internal quaternary phenyl-alkanes of less than about 8.

5. The composition of Claim 1 wherein the phenyl-alkanes have a selectivity to internal quaternary phenyl-alkanes of less than 5.

6. The composition of Claim 1 further characterized in that the phenyl-alkanes have a selectivity to phenyl-alkanes having an aliphatic alkyl portion containing a quaternary carbon atom not bonded by a carbon-carbon bond with a carbon atom of the phenyl portion of less than 1.

7. The composition of Claim 1 further characterized in that the feed stream has a concentration of the lightly branched paraffin of more than about 30 mol-%.

8. The composition of Claim 1 further characterized in that the process comprises simulating the use of a moving bed of adsorbent.

9. The composition of Claim 1 further characterized in that the lightly branched acyclic paraffin comprises a monomethyl paraffin.

10. The composition of Claim 1 further characterized in that the desorbent stream comprises a compound selected from the group consisting of normal pentane, normal hexane, methylcyclohexane, a cyclopentane, and isooctane.

11. The composition of Claim 1 further characterized in that the alkylation catalyst comprises a zeolite having a zeolite structure type selected from the group consisting of BEA, MOR, MTW, and NES.

12. The composition of Claim 1 further characterized in that the absorption extract steam has a concentration of the normal paraffin of less than about 75 mol-%.

13. The composition of Claim 1 further characterized in that the lightly branched acyclic comprises a lightly branched olefin having 3 primary carbon atoms and that the at least a portion of the dehydrogenated product stream has a concentration of the lightly branched olefin of more than 85 mol-%, based on the total lightly branched olefins in the at least a portion of the dehydrogenated product stream.

14. The composition of Claim 1 further characterized in that a makeup stream comprising nonbranched paraffins passes to the dehydrogenation zone.

15. The composition of Claim 1 further characterized in that the feed stream has a concentration of the normal paraffin of more than 0.3 mol-%.

16. A modified alkylbenzene sulfonate composition produced by a process, the process comprising the steps of:

a) passing a feed stream comprising a lightly branched C_8 -C_{28} acyclic paraffin and at least one other acyclic paraffin and having a first concentration of the lightly branched acyclic paraffin to an adsorption zone comprising a bed of an adsorbent comprising silicalite at adsorption promoting conditions to selectively adsorb the lightly branched acyclic paraffin, contacting the bed of adsorbent with a desorbent stream comprising at least one component selected from the group consisting of a C_5-C_8 cycloparaffin, a C_5-C_8 normal paraffin, and a C_5-C_8 branched paraffin and recovering from the adsorption zone an adsorption extract having a second concentration of the lightly branched acyclic paraffin that is greater than the first concentration;

b) passing at least a portion of the adsorption extract to a dehydrogenation zone, operating the dehydrogenation zone at dehydrogenation conditions sufficient to dehydrogenate the lightly branched acyclic paraffin, and recovering from the dehydrogenation zone a dehydrogenated product steam comprising a lightly branched C_8-C_{28} acyclic monoolefin;

c) passing a feedstock comprising a phenyl compound and passing at least a portion of the dehydrogenated product stream comprising the lightly branched acyclic monoolefin, to an alkylation zone, operating the alkylation zone at alkylation conditions sufficient to alkylate the phenyl compound with the lightly branched acyclic monoolefin in the presence of a solid, molecular sieve alkylation catalyst to form phenyl-alkanes comprising molecules having one phenyl portion and one C_8-C_{28} aliphatic alkyl portion; wherein the aliphatic alkyl portion wherein the aliphatic alkyl portion and no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the phenyl portion; and wherein the phenyl-alkanes have a selectivity to 2-phenyl-alkanes of from about 40 to about 100 and a selectivity to internal quaternary phenyl-alkanes of less than 10;

d) withdrawing an alkylate product stream comprising the phenylalkanes from the alkylation zone and contacting at least a portion of the alkylate product stream

with a sulfonating agent at sulfonation conditions sufficient to sulfonate phenyl-alkanes and to produce a sulfonated product stream comprising phenyl-alkane sulfonic acids; and

e) contacting at least a portion of the sulfonated product stream with a neutralizing agent at neutralization conditions sufficient to neutralize phenyl-alkane sulfonic acids and to produce phenyl-alkane sulfonates.

17. A modified alkylbenzene composition produced by a process, the process comprising the steps of:

a) passing a feed stream comprising a desired monomethyl paraffin and a raffinate compound to a bed of an adsorbent comprising silicalite, wherein the adsorbent selectively retains the monomethyl paraffin, wherein the bed is located in a continuous simulated moving bed adsorptive separation zone comprising an adsorbent chamber containing a number of compartmentalized beds of the adsorbent, and wherein the compartmentalized beds are separated by transfer points for streams used in the process, and withdrawing a raffinate stream comprising the raffinate compound from the adsorbent chamber;

b) passing a desorbent stream comprising at least one desorbent selected from the group consisting of a C_5-C_8 cycloparaffin, a C_5- C_8 normal paraffin, and a C_5-C_8 branched paraffin, to the adsorbent chamber, and removing an extract stream comprising the desorbent and the desired monomethyl paraffin from the adsorbent chamber;

c) periodically incrementing the transfer points in the adsorbent chamber of the feed, desorbent, extract, and raffinate streams to simulate countercurrent movement of the beds of adsorbent and the feed stream;

d) passing at least a portion of the extract stream to a dehydrogenation zone, operating the dehydrogenation zone at dehydrogenation condition sufficient to dehydrogenate the monomethyl paraffin, and recovering from the dehydrogenation zone a dehydrogenated product stream comprising a monomethyl monoolefin;

e) passing a feedstock comprising benzene and passing at least a portion of the dehydrogenated product stream comprising the monomethyl monoolefin to an alkylation zone, operating the alkylation zone at alkylation conditions sufficient to alkylate benzene with the monomethyl monoolefin in the presence of a solid, molecular sieve alkylation catalyst to form phenyl-alkanes comprising molecules having one phenyl

portion and one aliphatic alkyl portion; wherein the aliphatic alkyl portion has 2 or 3 primary carbon atoms and no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the phenyl portion; and wherein the phenyl-alkanes have a selectivity to 2-phenyl-alkanes of from about 40 to about 100 and a selectivity to internal quaternary phenyl-alkanes of less than 10 and a selectivity to phenyl-alkanes having an aliphatic alkyl portion containing a quaternary carbon atom not bonded by a carbon-carbon bond with a carbon atom of the phenyl portion of less than 1; and

f) recovering the phenyl-alkanes from the alkylation zone.

18. The composition of Claim 17 wherein the phenyl-alkanes have a selectively to 2-phenyl alkanes of from about 50 to about 100.

19. The composition of Claim 17 wherein the phenyl-alkanes have a selectively to 2-phenyl alkanes of from about 60 to about 100.

20. The composition of Claim 17 wherein the phenyl-alkanes have a selectivity to internal quaternary phenyl-alkanes of less than 5.

21. A modified alkylbenzene composition produced by a process comprising the steps of:

a) providing a feed stream comprising a feed mixture comprising aromatic hydrocarbons;

b) enriching the first feed stream for lightly branched paraffins to produce a second feed stream, wherein the second feed stream contains a higher concentration of lightly branched paraffins based on the total paraffins in the second feed stream, than the concentration of lightly branched paraffins in the feed mixture based on the total concentration of paraffins in the feed mixture;

c) dehydrogenating components of the second feed stream to produce a dehydrogenated product stream comprising lightly branched monoolefins;

d) passing a feedstock comprising a phenyl compound and passing at least a portion of the dehydrogenated product stream to an alkylation zone under conditions, using a solid, molecular sieve alkylation catalyst, sufficient to alkylate the phenyl compound with the lightly branched monoolefin and form an alkylate product stream comprising phenyl alkanes;

e) contacting at least a portion of the alkylate product stream with a sulfonating agent under conditions sufficient to sulfonate phenyl alkanes and produce phenyl-alkane sulfonic acids; and

f) neutralizing the phenyl-alkane sulfonic acids and to produce phenyl-alkane sulfonates,

wherein the aliphatic alkyl portion of the phenyl-alkane sulfonic acid have no quaternary carbon atoms except for any quaternary carbon atom bonded by a carbon-carbon bond with a carbon atom of the phenyl portion, and wherein the phenyl-alkanes have selectively to 2-phenyl-alkanes of from about 40 to about 100 and a selectivity to internal quaternary phenyl-alkanes of less than 10.

22. The composition of claim 21, wherein the first feed stream is enriched for lightly branched paraffins by contacting the first feed stream with an adsorption zone comprising a bed of an absorbent comprising silicalite at adsorption promoting conditions to selectively adsorb the lightly branched paraffins.

23. The composition of claim 21, wherein the feed mixture has a concentration of the lightly branched paraffin of more than about 30 mol-%.

IX. Appendix: Evidence

There is no evidence pursuant to §§ 1.130, 1.131, or 1.132 to be submitted.

X. Appendix: Related Proceedings

There are no related proceedings.

Respectfully submitted,

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